Mold Hazard Evaluation

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Introduction

- Today's program focuses on :

  Evaluation

- Not:
  - Control
  - Causes
  - Remediation
  - Health hazards

What is Mold?

A growth of fungi forming a hairy patch, as on stale bread or cheese.

Mold

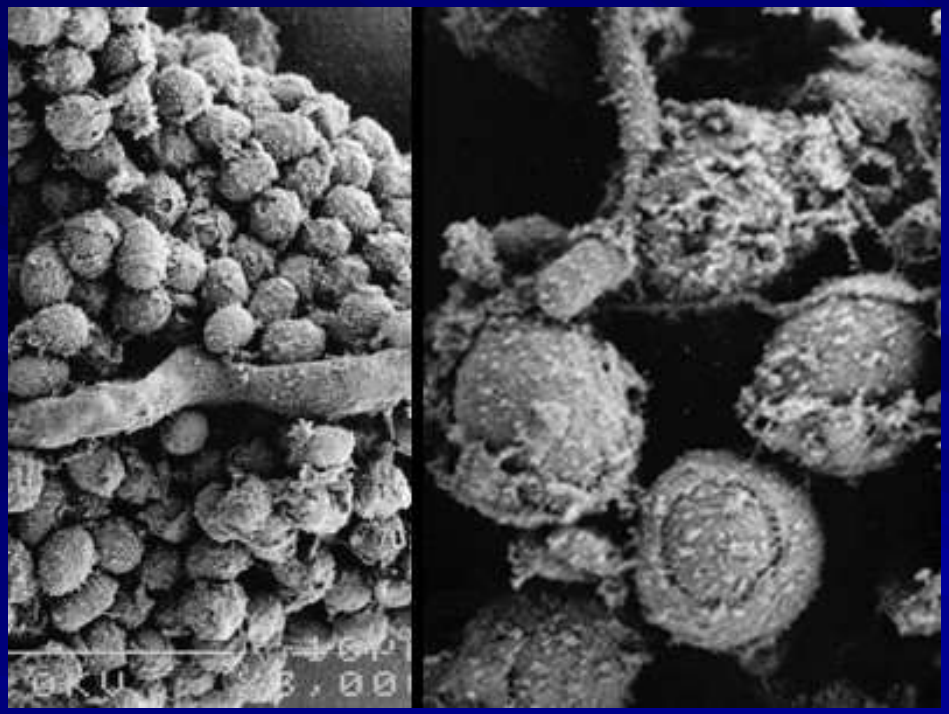


photo courtesy of John Martyny, Ph.D.

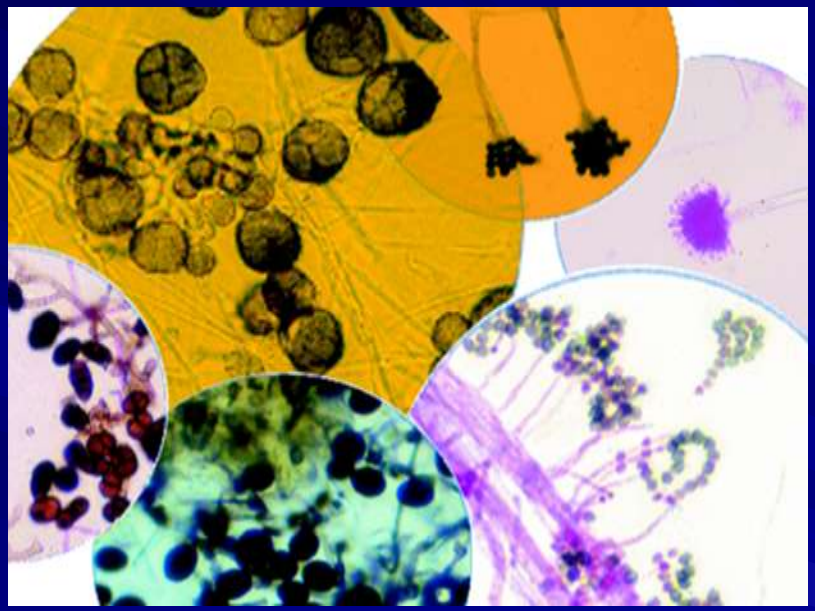
Mold in Petri Dishes

photo, Stephen Vesper, Ph.D

Mold Spores

photo courtesy of John Martyny, Ph.D.

Mold



Mold Photos

wall cavity

fiberboard shelf

Introduction

- Molds found in indoor air are saprotropic, - obtain food from dead moist organic materials
- Molds can also grow on the surface of damp inorganic matter that is covered by an invisible *biofilm*

Introduction

- Mold spores are found basically everywhere

Health Effects

- Allergic response – mucous membranes
- Dermatitis
- Can aggravate asthma
- Hypersensitive pneumonititus
- Can be significant problem in health care occupancies
- Toxic mold???

Health Effects

- Depends on dose = duration of exposure plus concentration
- Health of the individual
- Species

Mold Hazard Evaluation

- This program content reflects my approach to the subject
- Three phases:
  1. Gather information
  2. Walk through (visual examination)
  3. Measurements

Gathering Information

Why have you been called to this building, floor or space?

Is this a recurrent problem or is it new?

Gathering Information

What are the complaints?

a. Nature
b. Distribution
c. Temporal
d. Are they below grade?
e. Is this really “mold”? (Occupants)

Gathering Information

- Do the complaints match the symptoms of mold exposure?

Gathering Information

- Are there other issues in the workplace?
  - Labor management dispute
  - New management
  - Uncertainty of employment
  - General unrest
  - Significant change that was not communicated to the workers
- It may be difficult to uncover these hidden issues

Gathering Information

- Eliminate other indoor air quality issues
  - dust
  - new substances in use
  - outdoor pollutants brought inside the building
  - construction related
  - HVAC problems

Gathering Information

- Has the use of this area changed?
  - Occupancy type
  - Occupant load

Gathering Information

- Recent changes or problems with the ventilation system
- Has the HVAC system been checked?

Mold Hazard Evaluation

- Second Phase – Walk Through Survey

Sensory Evaluation

- Examine the area using your senses

- Initial hazard evaluation- use:
  - Sight
  - Smell
  - Feel

Sensory Evaluation

- Using your senses is quick, inexpensive and can be revealing
- It's individualized
- PPE may be necessary

Hazard Evaluation – Visual

- Initial Walk Through
  - Look for:
    - Signs of leaks – old or new
      - Stained ceiling tile
      - Streaks on the wall
      - Discolored carpet or tile
      - Rust at the bottom of filing cabinet
      - Efflorescence

Photo from nachi.org

metrohome.us

Stains

Moisture

- Condensation

- Water Leaks

Hazard Evaluation – Visual

- Mold on ceiling HVAC diffuser

Hazard Evaluation - Odor

- Smell for:
  - Dampness
  - Stale air
  - Moldy smell
  - Wet carpet

- Ability to smell can vary from person to person
- Females appear to have a better sense of smell?

Hazard Evaluation - Odor

- How do the occupants characterize the odor?

- Results can vary
  - Example: dead fish, burning insulation, dead animal

Hazard Evaluation - Visual

- Look for:
  - Colonized mold growth
    - On the wall or ceiling
    - In an area with limited light, limited air flow
    - Above drop ceilings

Hazard Evaluation - Visual

- Look for:
  - Colonized mold growth
    - Organic unsealed surfaces
    - HVAC ducts, coils, condensate pans, diffusers, ceiling near diffusers
    - Cooler adjacent surfaces (ceiling or wall)
    - Utilities leak

Hazard Evaluation - Visual

- Presence of dehumidifiers – indicates a moisture or humidity problem

Hazard Evaluation - Feel

- Feel for:
  - high levels of humidity
  - damp carpet
  - damp wall board

Hazard Evaluation

- Don’t forget to check hidden or adjacent areas
  - Mechanical rooms
  - Floors above and below the complaint area
  - Above drop ceiling
  - Crawl space

Hazard Evaluation

- More invasive review
  - Wall cavities
  - Under carpet
  - Behind wall paper

Hazard Evaluation

- Results of the initial walk through will probably give you an idea as to whether there is a problem.
- What are the results at this point?
- Communicate results to occupants.

Hazard Evaluation

- If you can’t convince occupants there is no hazard, what then??

Hazard Evaluation

- Answer – measurements
  - Air
  - Surface
  - Moisture
  - Humidity
  - Carbon dioxide

Humidity

- Check for relative humidity
- Can run long duration profiles or instantaneous values
- An indirect indicator that can be used in your report

Hazard Evaluations - Humidity

- Indoor levels generally should be 40-60%

Hazard Evaluation - Moisture

- Direct measurement probes
- Quick and inexpensive
- Can be used for relatively soft porous surfaces

Hazard Evaluation – Air Sampling

- Not always good industrial hygiene, but often convinces the disbelievers
- No regulatory limits on airborne mold
- Does provide quantitative evidence for future liability

Hazard Evaluation – Air Sampling

- Only provides a snap shot of mold at that time for that location
- Bulk sampling may be of limited value

Hazard Evaluation – Air Sampling

- Air sampling is generally enough
- Air cell measures mold, mold fragments plus you can even get pollen and other particulates (e.g. skin) analyzed

Hazard Evaluation – Air Sampling

- Collect outdoor vs. indoor samples
- Sample in complaint area and non-complaint area
- Use good sampling techniques – can get from lab
- Use calibrated sampling equipment

Hazard Evaluation- Air Sampling

- More samples = better picture of the true levels
- Cost can be a factor
- About $50 per sample

Hazard Evaluation – Air Sampling

- Use an AIHA accredited laboratory
- Ask for QA/QC data
- Collect data on sampling
  - Where
  - When
  - Use
  - Weather conditions
  - Chain of custody

Hazard Evaluation

- Interpreting results and forming conclusion
- Results can vary greatly – even for concurrent or consecutive samples take in the same area at the same time

Hazard Evaluation

- *Relative* comparison between:

1. Total indoors vs. total outdoors
2. General composition (or species) between indoor and outdoor

Hazard Evaluation

- Generally find that indoor levels are about 5-10% of outdoor levels
- May find indoor levels 1-2% of outdoor levels
- If indoor levels are above outdoor levels, you have a problem (explain)

Hazard Evaluation

- In the majority of cases, we find the same relative types of species in indoor air vs. outdoor air
- Be careful when dealing with clean indoor air; the presence of a single species may seem misleading

Hazard Evaluation

- Surface sampling – dust or carpet samples are of limited value
- Can be a measure of housekeeping
- Does provide some history of species

Hazard Evaluation

- Fresh air exchange – can measure carbon dioxide as a surrogate of fresh air.
- Get a baseline of outdoor levels – can be high (example 600 ppm) in urban air.

Mold Hazard Evaluation

- Must look at :
  - Environment
  - Individuals

Mold Photos

- http://www.epa.gov/mold/moldcourse/imagegallery5.html

http://www.skcinc.com/prod/225-9820.asp

Summary

- Mold is everywhere
- 3 sections to hazard evaluation
  - Gathering information
  - Walk through (sensory)
  - Measurements
- Care must be exercised when evaluating air sampling results